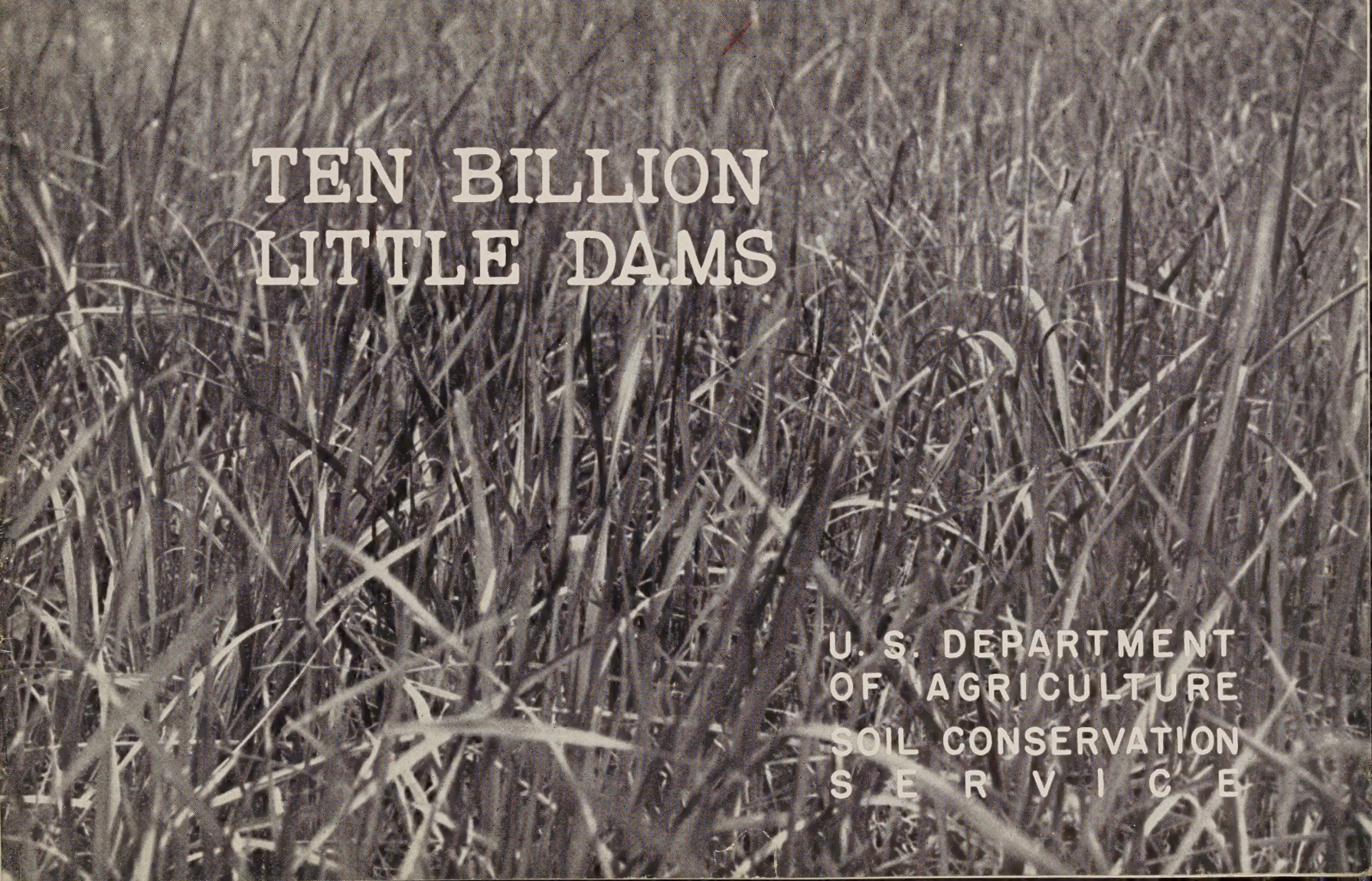
TEN BILLION
LITTLE DAMS
U. S. DEPARTMENT
OF AGRICULTURE
SOIL CONSERVATION
S E R V I C E

Upstream engineering seeks to slow the raindrop in its journey to the sea

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IN THE uplands, where floods form, nature teaches a lesson by throwing across practically every foot of land under forest or natural grass cover an interlacing system of tiny dams. A dead leaf, a blade of grass, or a root tangle can stop a raindrop from running, hold it back; and floods are made up of raindrops infinitely multiplied.

Wise land use is simply an adaptation of nature's conservation and flood-control methods to the conditions of advanced cultivation. Instead of leaving fields smooth and bare, inviting erosion, the idea is rather to roughen the surface, turn the earth itself and the plants themselves, into impediments to run-off, protectors of the soil. By the simple device of plowing and cultivating around the hill, on the contour, instead of up and down the hill, each furrow, each harrow scratch, becomes in effect a small dam or terrace. On steeper slopes somewhat more elaborate methods may be needed, but the principle of all of them is simple: To make running water walk or creep, to store a far greater part of it in that greatest of all reservoirs—the soil; and to do this by making the soil and its crops provide, as impediments to run-off, millions of natural little dams.

Agriculture cannot offer a substitute for floodwater fortifications downstream, but it can offer a multitude of reinforcements upstream, where the raindrop falls upon the land.

HENRY A. WALLACE.

GRASS

GRASS anchors soil against erosion. Its decaying remains make the soil absorptive. Its roots bind the soil in place and open tiny conduits into the earth. Its blades and stalks are countless tiny impediments to the downhill flow of water that has fallen on the land. Slow water does little damage; grass makes running water creep. Neither man nor nature has

found a more effective weapon against soil and water waste.

Soil conservation makes extensive use of grass. Good pastures shed little water, lose little soil. Meadowlands are well protected by their covering. Grass-paved waterways and terrace outlets conduct excess rainfall slowly and harmlessly downhill to drainage streams.

AT BETHANY, Mo., a field of grass lost 9 percent of the rainfall and one-third of a ton of soil per acre, during an experimental period. A similar field, bare of vegetation, lost 31 percent of the rainfall and 113 tons of soil per acre.

TREES

FOREST puts a roof above the soil, covers it with a protecting carpet, and ties it into place with grasping roots. Rain strikes gently beneath trees. Running water finds myriad obstructions on forest floor matted thick with fallen leaves

At Statesville, N. C., a field bare of vegetation lost 30 percent of the rainfall and 65 tons of soil per acre during an experimental period. Adjoining forest land that had never been cleared lost 0.12 percent of the rainfall and 0.002 tons of soil per acre.

and twigs. Water finds it hard to move forest-anchored soil.

On millions of acres trees are nature's ultimate soil protectors. On the steepest slopes, up the ragged banks of gullies—where nothing else will do—trees stay the flow of running water and hold the soil in place.

CROPS

TO GROW crops, man must till the soil. But cultivation and conservation are not incompatible. Man can adapt both crops and cropping practices to the purposes of conservation.

Strip cropping is such an adaptation. Clean-tilled crops invite erosion, offer no resistance to run-off water. Thick-growing crops hold soil, are barriers to running water. In a strip-cropped field, dense crops alternate with clean-tilled crops

At Temple, Tex., a field of cotton lost 20 percent of the rainfall and 52 tons of soil per acre in one experiment. A similar cottonfield, strip cropped, lost 9 percent of the rainfall and 5 tons of soil per acre.

in bands around the contours of the land. Soil-laden water from the strip of clean-tilled land is stayed and filtered of its load by the close-growing crop in the strip below.

Soil conservation protects gently sloping fields with strip cropping. It combines the practice with terracing to protect even steeper slopes. It applies the principle of rotation to the strips for increasing the soil's fertility, its absorbency, and its resistance to erosion.

FURROWS

FURROWS up and down the slope are gutters that concentrate and speed rainfall, with its burden of topsoil, from the land to drainage streams.

Furrows around the slope are dams that hold rainfall on the land, store it in the vast reservoir of the soil.

AT CLARINDA, IOWA, a field of corn with rows up and down the hill lost 10 percent of the rainfall during a 3-year period and 40 tons of soil per acre. A similar cornfield with rows on the contour lost 0.1 percent of the rainfall and no soil.

Soil conservation tills sloping land on the contour, never up and down. It spaces contour furrows at intervals on pasture land to dam up rainfall, force it to penetrate the earth. Moisture in the soil increases the growth of grass, and grass, in turn, puts its own countless tiny dams across the path of run-off water.

TERRACES

SLOPING cultivated fields are waterways. Rain water runs from steeply sloping land with the speed of a mountain torrent. Strong dams and large ones are needed.

Terraces are cropland dams across the face of cultivated fields. Broad-based, and with proper grades, they offer sturdy resistance to the downhill rush of water, yet make no clumsy ridge to interfere with tillage.

AT SPUR, Tex., level terraces, closed at the ends, have held all the rainfall. In Nebraska, a level terrace, a half mile long, held 118,500 gallons of water after a single rain.

Farmers plow the terrace as they plow the field, or sow it broadcast with grass or grain that binds the soil.

Soil conservation builds terraces around the contours of steeply sloping land and supports them with strip cropping and contour tillage. It puts grass-paved waterways at the terrace end to carry excess water harmlessly downhill to a protected area or drainage stream.

DAMS

GULLY control begins on land that sheds water into gully channels. But down in the gully itself, inexpensive dams slow the flow of water, nullify its cutting power, force it to drop its load of silt. Vegetation, with its network of clutching roots, can take permanent control.

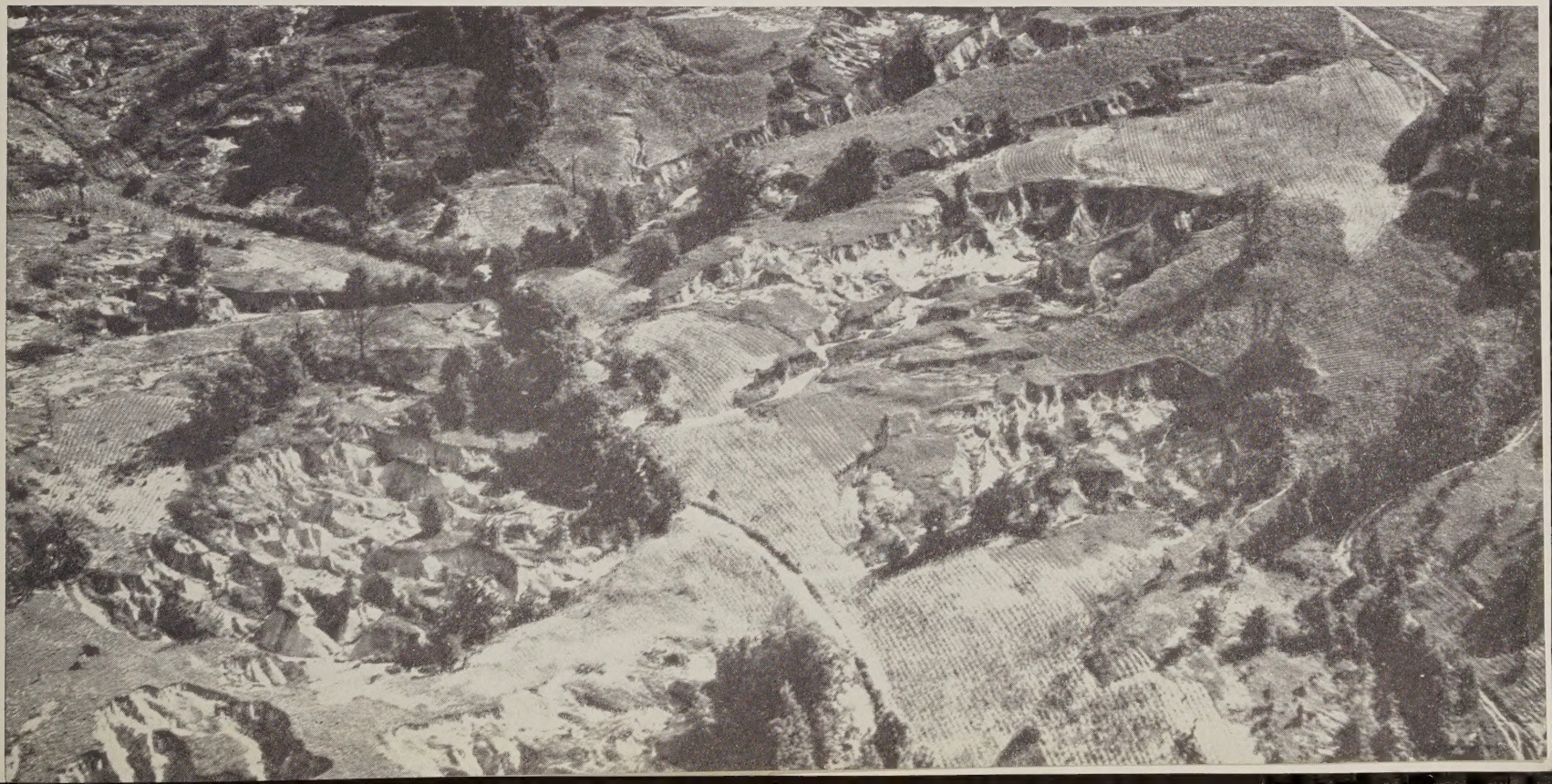
A small dam can turn a nat-

NEAR BISMARCK, N. Dak., a farmer built a small dam for stock water. During the drought this little reservoir irrigated 42 acres. He produced enough hay to feed 50 head of stock, including 10 milk cows. He sold corn, potatoes, carrots, tomatoes, cream, chickens, and eggs—all from one little dam.

ural drainage, a depression in the land, a potential gully into a farm pond or reservoir for building up both surface and underground supplies of water. Water for stock, for crops, sometimes even for power and recreation, can be caught by little dams. And water held on the land cannot swell streams to flood stage.

PROTECTION

DESTRUCTION



AS PART of its program for the better use of farm and range lands, the Soil Conservation Service is helping to safeguard the soil of the Nation from erosion. Over most of the United States this means controlling the run-off of rainfall. Experiments have demonstrated that from 5 to 75 percent of the water from heavy rains runs off immediately where sloping land is cultivated without protection. Also lost with this rainfall is an enormous amount of topsoil, carried downhill by the force of swift-running waters. Soil conservation, therefore, is also moisture conservation. It involves the use of practically every known method of storing rainfall in the great reservoir, the soil.

The work of conserving soil and moisture, which forms the heart of the Soil Conservation Service program, is carried out in watershed units. Major emphasis is placed on cooperative work with soil conservation districts organized in watershed areas by local farm operators under State laws. These districts place the responsibility for conserving soil and moisture chiefly with those who till and graze the land, and they institute democratic methods whereby local communities can protect a common interest in their land resources. The Soil Conservation Service assists the districts with technical advice, and provides facilities for carrying out the more specialized kinds of work that they require.

In the soil conservation districts, and in demonstration areas where the Soil Conservation Service cooperates directly with individual farmers, the objective is to devote every acre of the

watershed to the practical uses for which Nature has best fitted it, and to make economical use of every drop of water that can be conserved in a practical way.

Effective plans for the complete conservation of a watershed call for more than the application of such conservation practices as are described in this booklet. They demand changes also in the division of land as among crops, pasture, and woods, the purchase and retirement of submarginal farms that cannot be operated profitably under private ownership, the encouragement of better forestry practices in farm woods, and the coordination of these activities with others that apply in the over-all endeavor to harness destructive floods.

These activities make up the program that the Soil Conservation Service now carries on in cooperation with the States and with farmers on the land. The building of "ten billion little dams" represents the physical objective in terms of soil and water; the development of more suitable types of farming and patterns of land use are inevitable economic counterparts. Finally, only through the organized cooperative action of enlightened groups of citizens, from the smallest soil conservation district to the Nation as a whole, can the proper husbandry of our soil resources be realized.

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